Advertising repetition and complexity of digital signage advertisements: simplicity rules!

Abstract

Digital signage is probably the most skyrocketing advertising medium of the moment, since the LCD-screens are almost impossible to avoid in everyday life for consumers, while few academic research is present to explore the potential of this medium. An experiment (3x2x4) was conducted to test the role of the intensity of complexity (simple/moderate/complex), the dimension of complexity (visual/lexical) and the level of repetition (one/four/seven/ten exposures) on the attitude toward digital signage advertisements (Aad). The results indicate a significant influence of advertising complexity on Aad, where simple ads with a dominant visual component clearly work best.

Keywords: *Advertising Repetition, Advertising Complexity, Digital Signage Advertisements*

Track: *Advertising, Promotion and Marketing Communications; New Technologies and E Marketing*

1. Introduction

Digital signage is all around us. The LCD-screens pop up everywhere: on subway platforms, in shops, elevators, bars and waiting rooms. A typical characteristic of digital signage is that messages appear multiple times in a very short period (Burke, 2009). The latter aspect is in contrast with, for example, a classic TV ad to which consumers also may be exposed multiple times, but with larger time gaps between exposures. The question remains if results showing the influence of ad repetition on classic TV ads (Nordhielm, 2002) can be applied to digital signage ads. Burke (2009) already suggested that digital signage is not like at-home advertising. Burke (2009) also suggests that there are potential important content and presentation variables that may moderate the response to digital signage ads. However, little academic research exists on the effectiveness of digital signage ads. To begin to fill this gap, this study explores the impact of ad repetition, intensity and type of complexity on the attitude toward digital out-of-home ads. More specifically, we investigate visual and lexical complexity at a low (simple), moderate and high (complex) level for four different repetition levels (one, four, seven and ten exposures).

2. Theoretical Background

2.1 Advertising repetition effects

Berlyne (1970) suggests that affect toward a repeated stimulus is determined by two factors: habituation and tedium. A novel stimulus initially may be too unfamiliar and arousing, and may create uncertainty. Initial levels of message repetition serve to enhance habituation, so the stimulus becomes familiar, appealing and less arousing by getting to know the stimulus. However, continued repetition may cause tedium to arise, because of boredom and less learning. The boredom in this phase may be perceived as negative affect and may cause the message effectiveness to decrease (Anand and Sternthal, 1990).

On the one hand, many studies delivered support to Berlyne's theory and proved that respondents' attitudes toward the advocacy enhance by multiple exposures and that a decline in brand evaluations sets in after a certain level of message repetition (e.g. Anand and Sternthal, 1990; Cacioppo and Petty, 1979; Nordhielm, 2002). On the other hand, several researchers were not able to detect an effect of message repetition on judgements and attitudes (Belch, 1982; Burke and Srull, 1988; Rethans et al., 1986).

A possible explanation for these contradictory results may be the complexity level of the stimuli used in the different studies as Berlyne already pointed out in 1970 (Anand and Sternthal, 1990; Cox and Cox, 1988). He suggested that simple stimuli (e.g., a simple ad) would allow quicker learning, so the maximum affective response should be reached with fewer exposures, whereas complex stimuli (e.g., a complex ad) might need more exposures before habituation sets in (Janiszewski and Meyvis, 2001).

2.2 Advertising complexity

Complexity can be generally defined as "the amount of variety or diversity in a stimulus pattern" (Berlyne, 1960, p. 38). Four different complexity dimensions can be distinguished: visual, lexical, technical and informational (Stevenson et al., 2000; Bradley and Meeds, 2002, 2004; Putrevu et al., 2004; Chamblee et al., 1993). In this study, we will take a closer look at visual and lexical complexity, since those dimensions refer to the visual and verbal elements which form the

basic of every digital signage ad. Visual complexity can be defined as a function of the number of distinct elements in the stimuli, the dissimilarity between such elements and the degree to which the combinations of stimulus elements correspond to a single unit (Berlyne, 1958). Lexical (also called verbal or syntactic) complexity refers to the linguistic structure and semantic content of advertising messages (Lowrey, 1998, 2006; Putrevu et al., 2004).

For many years, 'simplicity' appeared to be a magic word in ad agencies when it comes to developing advertising messages (Anderson and Jolson, 1980; Shuptrine and McVicker, 1981; Chamblee et al., 1993). However, academic research cannot provide convincing evidence that simplicity overpowers complexity. With respect to visual complexity, for example, on the one hand researchers have found that consumers are more motivated to attend visually complex ads, spend more time looking at visually complex ads and process those ads more deeply (MacInnis et al., 1991; Morrison and Dainoff, 1972; Phillips, 1997). On the other hand, complex visual elements act as strong distracters and elicit less vivid imagery than simple visual elements (Edell and Staelin, 1983; Rossiter and Percy, 1983).

Concerning the lexical dimension, some researchers suggest that the use of lexically complex messages is not that effective since those messages necessitate more processing effort, decrease recall and have no effect on purchase intention (Bradley and Meeds, 2002; Lowrey, 1998; Macklin et al., 1985). In contrast, Chamblee et al. (1993) found that the use of complex verbal language in advertisements can help ad readership and enhance attitude formation and memory.

Our study aims to investigate whether the effectiveness of digital signage advertisements indeed differs for different levels (simple/moderate/complex) of visual and lexical complexity at different levels of exposures (one/four/seven/ten). As such we hope to make a valuable contribution to the field of academic digital signage research.

3. Hypotheses development

As noted earlier in this paper, mixed results are delivered concerning the effectiveness between the use of a simple or a complex ad. Research indicates that, on the one hand, simple ads appear to gather higher Aad scores (Lowrey, 1998; Morrison and Dainoff, 1972; Rossiter and Percy, 1983), while, on the other hand, complex ads also appear to gather higher Aad scores (Anderson and Jolson, 1980; Chamblee et al., 1993; Lowrey, 2006; Phillips, 1997). Burke (2009) suggests that, in a digital signage context, simple messages produce greater response as the audience is not willing to put cognitive effort in processing the message. We suggest the following hypothesis:

H1 Simple ads score higher on Aad than moderate complex ads and moderate complex ads score higher on Aad than complex ads.

Several researchers have studied the effects (e.g. recall, recognition and attitude) of visual versus verbal components of advertisements and the dissimilar ways in which these two components are processed cognitively (Childers et al., 1986; Edell and Staelin, 1983; Mitchell and Olson, 1981; Obermiller, 1985; Rossiter and Percy, 1983). It seems that the visual components of ads are processed more easily than the verbal components of ads which generates better attitude, recall and recognition scores for ads with a dominant visual component in comparison to ads with a dominant verbal component (Edell and Staelin, 1983). As the digital signage audience is not willing to engage in extensive cognitive effort, we expect visual ads (with a dominant visual component) to score better on Aad than lexical ads (with a dominant text component):

H2 Visual ads will score higher on Aad than lexical ads.

As mentioned before, respondents might appreciate simple digital signage ads above complex ones. In addition, visual ads could be appreciated above lexical ads. Hence, we expect a more positive Aad score for the visually simple ad than for the lexically simple ad. The same can be expected for the complex ads: a higher Aad score for the complex visual ad in comparison to the complex lexical ad. This leads to our third hypotheses:

H3 (a) The visually simple ad scores higher on Aad than the lexically simple ad.

H3 (b) The visually complex ad scores higher on Aad than the lexically complex ad.

Based on Berlyne's theory of repeated exposure (two-factor model), it can be expected that attitude toward a digital signage ad increases with repeated exposures because the uncertainty decreases (Cox and Cox, 1988). This information leads us to the following hypothesis:

H4 Repeated exposures to an ad has a positive effect on Aad.

When combining Berlyne's theories of repeated exposure and stimulus complexity, it seems likely that the attitude toward high-complex ads increases with repeated exposures (because of decreasing uncertainty) (Cox and Cox, 1988). However, after multiple exposures the attitude might decrease because tedium sets in. For a low-complex ad tedium and boredom might set in after only a few exposures (due to its simplicity). As such, repeated exposures will decrease the attitude toward simple digital signage ads. This information leads to the following hypotheses:

H5 (a) Across repeated exposures, the Aad scores of complex ads first increase and later decrease.

H5 (b) Across repeated exposures, the Aad scores of simple ads decrease.

Childers et al. (1986) proved that more elaborative encoding occurs for the visual versus the verbal (lexical) portion of the ad. Obermiller (1985) mentioned that uncertainty reduction occurs as a result of increasing the elaboration of encoding. Combining those two facts offers us an interesting vision concerning the uncertainty reduction, repetition effects and the complexity dimensions of digital signage ads. Since the visual component of an ad is processed more thoroughly than the verbal component of an ad, it might be expected that multiple exposures engender better Aad scores for the visual digital signage ads (because of easy uncertainty reduction), than for the lexical digital signage ads (because of very slow uncertainty reduction) (Childers et al., 1986; Edell and Staelin, 1983). This leads to the following hypothesis:

H6 Across repeated exposures, visual ads achieve higher Aad scores than lexical ads.

3. Method

The hypotheses were tested in an experimental study using a 2 (complexity dimension: visual/lexical) x 3 (complexity intensity: simple/moderate/complex) x 4 (level of repetition: one/four/seven/ten exposures) design. Three hundred and eighty six University students (218 female, 168 male; mean age=20.03, SD=1.67) took part in the study.

The respondents were all seated in front of a computer screen and were told that they were going to see a typical digital signage ad show. The slideshow consisted of two test ads and two filler ads which were all rotated and counterbalanced for order and repetition level. The respondent saw one visual and one lexical ad with a different level of complexity (for example a simple visual and a complex lexical) at a different level of repetition (for example one and four times). The test ads were specially designed for this experiment. USB flash drive (visual ads) and print

cartridges (lexical ads) were selected as the test-product categories since those types of products, as well as those of the filler ads, are part of respondents' field of interest. The visually simple ad was one where the respondents would know at a glance that the ad promoted a USB flash drive (the dominant feature was a picture of the USB flash drive), while the visually complex version required respondents to make sense of the message before they could identify that the ad promoted a USB flash drive (the background was full of small USB flash drives which were not easy to identify as USB flash drives upon exposure). The moderate complex ad was situated between the previous ads concerning the ease of message identification (Rossiter and Percy, 1983; Putrevu et al., 2004). The lexically complex ad holds compound sentences with more words and syllables (68 words, 3 sentences, 16 to 29 words per sentence (mean of 22.67), mean of 51 syllables per sentence) than the moderate ad (48 words, 5 sentences, 7 to 20 words per sentence (mean of 9.6), mean of 17.4 syllables per sentence) and than the simple ad (16 words, 3 sentences, 5 to 6 words per sentence (mean of 5.33), mean of 11 syllables per sentence). A pre-test confirmed that the complexity level manipulations of the test ads were adequate, since the complexity scores of the simple, moderate and complex ads were significantly different of each other ($t>4$, $p<.05$ for all paired comparisons)[1]. When the slideshow was finished, the respondents were asked to fill in a questionnaire. Besides some filler questions, attitude toward each ad was measured using six seven-point scales anchored by bipolar adjectives (Cronbach alpha=.76). Finally, the respondents' gender and age were recorded.

4. Results

The results of a 3-way analysis of variance indicate a main effect for complexity intensity and complexity type of the ad. The Aad scores for the low complexity ads (M=4.66, SD=1.23) are significantly higher than the Aad scores for the moderate complexity ads (M=4.02, SD=1.12) (t=5.31, p=.000), and those are in their turn significantly higher than the Aad scores for the high complexity ads (M=3.75, SD=1.11) (t=3.00, p=.003) supporting H1 (F(2,238)=45.55, p=.000). Further, the visual ads score higher on Aad (M=4.46, SD=1.22) than the lexical ads (M=3.72, SD=1.12) (t=7.15, p=.000) in a significant way, supporting H2 (F(1,738)=61.68, p=.000). The former main effects are qualified by an interaction effect between intensity and type of complexity (F(2,738)=10.47, p=.000), lending support for H3 a & b (see Figure 1). The visually simple ad scores significantly higher on Aad (M=5.23, SD=1.01) than the lexically simple ad (M=4.09, SD=1.19) (t=8.24, p=.000), and the visually complex ad scores significantly higher on Aad (M=3.98, SD=1.12) than the lexically complex ad (M=3.51, SD=1.06) (t=3.26, p=.000).
No main effect occurred for repetition (M_1=4.20, SD=1.14; M_4=4.01, SD=1.19; M_7=4.24, SD=1.26; M_{10}=4.13, SD=1.26; $t_{1\text{-}4}$=1.66, p=.097; $t_{4\text{-}7}$=-1.82, p=.071; $t_{7\text{-}10}$=0.83, p=.041) and no interaction effect appeared between repetition and intensity of complexity, so H4 and H5 (a & b) are rejected. However, H6 is supported since there is an interaction effect between repetition and type of complexity (F(3,738)=2.86, p=.036) (See Figure 2). At a frequency level of one, seven and ten repetitions the Aad scores for the visual ads (M_1=4.51, SD=1.10; M_7=4.62, SD=1.30; M_{10}=4.55, SD=1.20) are significantly higher than the Aad scores for the lexical ads (M_1=3.80, SD=1.06; M_7=3.88, SD=1.13; M_{10}=3.70, SD=1.19; t_1=4.95, p=.000; t_7=3.53, p=.001; t_{10}=4.38, p=.000) (at four repetitions no significant difference is found).

[1] Similar results were obtained in the main study.

To summarize, a main effect was found for intensity and type of complexity, and an interaction effect took place between these two variables. No main effect was found for repetition. Interestingly, no interaction effect occurred between repetition and intensity of complexity, while an interaction effect was found between repetition and type of complexity. So, hypotheses 1, 2, 3 (a & b) and 6 are supported and hypotheses 4 and 5 (a & b) have to be rejected.

Figure 1: Interaction effect between intensity and type of complexity

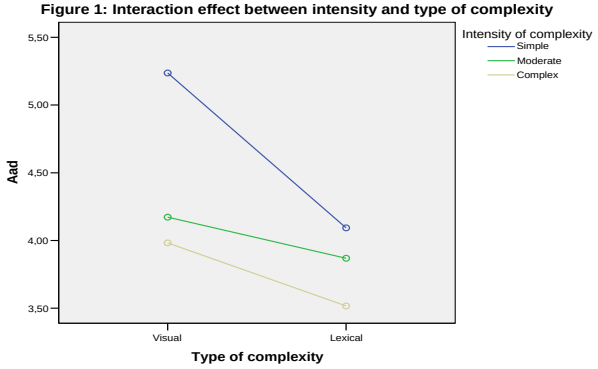
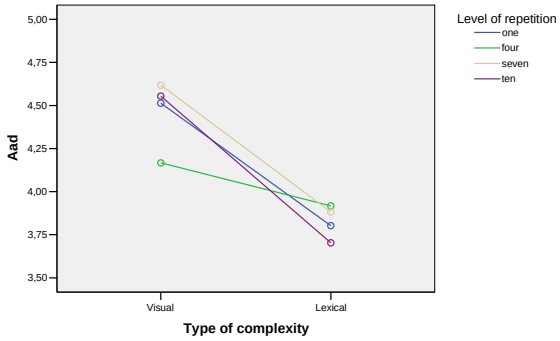


Figure 2 : Interaction effect between type of complexity and repetition



5. Conclusions

The current study was a test of the hypotheses that advertising repetition and complexity affects the attitude toward digital signage advertisements. Our results confirm the influence of different levels and dimensions of complexity on Aad for ads on digital signage networks and are in line with some previous researches performed with print ads (Anderson and Jolson, 1980; Shuptrine and McVicker, 1981; Chamblee et al., 1993; Lowrey, 1998, 2006; Morrison and Dainoff, 1972; Phillips, 1997; Rossiter and Percy, 1983; Stevenson et al., 2000; Bradley and Meeds, 2002, 2004; Putrevu et al., 2004). The Aad scores in this study indicate that advertising professionals better keep an eye on the complexity of messages when designing digital-out-of-home ads. Simple messages clearly outperform (moderate) complex ones and ads with a dominant visual component outperform ads with a dominant verbal component and as such bear out prior research (Anderson and Jolson, 1980; Lowrey, 1998, 2006; Morrison and Dainoff, 1972; Phillips, 1997; Rossiter and Percy, 1983; Childers et al., 1986; Edell and Staelin, 1983). Furthermore, visually complex ads get similar attitude scores as lexical simple and moderate complex ads, indicating that simplicity of ads is especially valued for visual ads.

Interestingly, the results show that the repetition of ads does not influence the evaluation of the ads. Ad evaluation does not enhance nor decrease after a certain amount of repetitions. Especially the lack of ad attitude decrease is good news for advertisers who are planning to use the digital signage medium, since repetition with a short time lag between exposures is an important characteristic of this new advertising medium.

The current results provide evidence that the level and dimension of advertising complexity has an influence on the attitude toward ads on digital-out-of-home networks where simple and visual ads get the highest scores. However, we have to keep in mind that in our study only ICT-equipment was used as product and two different products for the complexity dimensions were used and this may limit the generalization of the results. So, more research is needed. Further research could investigate whether similar results emerge for other product categories. Furthermore, future research could investigate other message content and context variables that possibly influence evaluation of digital signage ads. In this preliminary study we investigated the limited time lag between exposures as typical characteristic of digital signage. In next studies also the typical situational circumstances and the type of advertiser (local vs. global) will be studied.

References

Anand, P., Sternthal, B. (1990). Ease of message processing as a moderator of repetition effects in advertising. Journal of Marketing Research, 27 (August), 345-353.

Anderson, R.E., Jolson, M.A. (1980). Technical wording in advertising: implications for market segmentation. Journal of Marketing, 44, 57-66.

Belch, G.E. (1982). The effects of television commercial repetition on cognitive response and message acceptance. Journal of Consumer Research, 9 (June), 56-65.

Berlyne, D.E. (1958). The influence of complexity and novelty in visual figures on orienting responses, Journal of Experimental Psychology. 55 (3), 289-296.

Berlyne, D.E. (1960). Conflict, arousal, and curiosity. New York: McGraw-hill.

Berlyne, D.E. (1970). Novelty, complexity, and hedonic value. Perception & Psychophysics, 8 (5A), 279-286.

Bradley, S.D., Meeds, R. (2002). Surface-structure transformations and advertising slogans: the case for moderate syntactic complexity. Psychology & Marketing, 19 (7-8), 595-619.

Bradley, S.D., Meeds, R. (2004). The effects of sentence-level context, prior word knowledge, and need for cognition on information processing of technical language in print ads. Journal of Consumer Psychology, 14 (3), 291-302.

Burke, R.R., Srull, T.K. (1988). Competitive interference and consumer memory for advertising. Journal of Consumer Research, 15 (June), 55-67.

Burke, R.R. (2009). Behavioral effects of digital signage. Journal of Advertising Research, 49(2), 180-185.

Cacioppo, J.T., Petty, R.E. (1979). Effects of message repetition and position on cognitive response, recall and persuasion. Journal of Personality and Social Psychology, 37 (January), 97-109.

Chamblee, R., Gilmore, R., Thomas, G., Soldow, G. (1993). When copy complexity can help ad readership. Journal of Advertising Research, 33 (3), 23-28.

Childers, T.L., Heckler, S.E., Houston, M.J. (1986). Memory for the visual and verbal components of print advertisements. Psychology & Marketing, 3 (March/April), 137-150.

Cox, D.S., Cox, A.D. (1988). What does familiarity breed? Complexity as a moderator of repetition effects in advertisement evaluation. Journal of Consumer Research, 15 (June), 111-116.

Edell, J.A., Staelin, R. (1983). The information processing of pictures in print advertisements. Journal of Consumer Research, 10, 45-61.

Geissler, G.L., Zinkhan, G.M., Watson, T.C. (2006). The influence of home page complexity on consumer attention, attitudes, and purchase intent. Journal of Advertising, 35 (2), 69-80.

Janiszewski, C., Meyvis, T. (2001). Effects of brand logo complexity, repetition, and spacing on processing fluency and judgment. Journal of Consumer Research, 28 (June), 18-32.

Lowrey, T.M. (1998). The effects of syntactic complexity on advertising persuasiveness. Journal of Consumer Psychology, 7 (2), 187-206.

Lowrey, T.M. (2006). The relation between script complexity and commercial memorability. Journal of Advertising, 35 (3), 7-15.

MacInnis, D.J., Moorman, C., Jaworski, B.J. (1991). Enhancing and measuring consumers' motivation, opportunity, and ability to process brand information form ads. Journal of Marketing, 55 (October), 32-53.

Macklin, M.C., Bruvold, N.T., Shea, C.L. (1985). Is it always as simple as keep it simple. Journal of Advertising, 14 (4), 28-35.

Mitchell, A.A, Olson, J.C. (1981). Are product attribute beliefs the only mediator of advertising effects on brand attitude? Journal of Marketing Research, 18 (August), 318-332.
Morrison, B.J., Dainoff, M.J. (1972). Advertisement complexity and looking time. Journal of Marketing Research, 9 (4), 396-400.
Nordhielm, C.L. (2002). The influence of level of processing on advertising repetition effects. Journal of Consumer Research, 29 (December), 371-382.
Obermiller, C. (1985). Varieties of mere exposure: the effects of processing style and repetition on affective response. Journal of Consumer Research, 12 (June), 17-30.
Phillips, B.J. (1997). Thinking into it: consumer interpretation of complex advertising images. Journal of Advertising, 26 (2), 77-87.
Putrevu, S., Tan, J., Lord, K.R. (2004). Consumer responses to complex advertisements: the moderating role of need for cognition, knowledge, and gender. Journal of Current Issues and Research in Advertising, 26 (1), 9-24.
Rethans, A.J., Swasy, J.L., Marks, L.J. (1986). Effects of television commercial repetition, receiver knowledge, and commercial length: a test of the two-factor model. Journal of Marketing Research, 23 (February), 50-61.
Rossiter, J.R., Percy, L. (1983). Visual communication in advertising, in: Harris, R.J. (ed.), Information Processing Research in Advertising. Hillsdale, NJ: Lawrence Erlbaum Associates, 83-126.
Shuptrine, F.K., McVicker, D.D. (1981). Readability levels of magazine ads. Journal of Advertising Research, 21 (5), 45-51.
Stevenson, J.S., Bruner, G.C., Kumar, A. (2000). Webpage background and viewer attitudes. Journal of Advertising Research, 40 (1-2), 35-42.